

Miami-Dade Urban Tree Canopy Analysis

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Funding Agencies

- Miami-Dade County Parks and Recreation - Neat Streets Miami



- American Forests



AMERICAN FORESTS

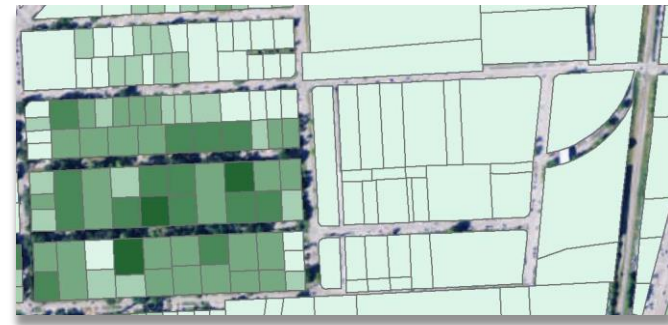
Project Scope

- Determine for the Urban Area of Miami-Dade County:
 - ❑ areas with current tree canopy (existing UTC)
 - ❑ areas with potential tree canopy (possible UTC)
 - ❑ areas unsuitable for tree canopy



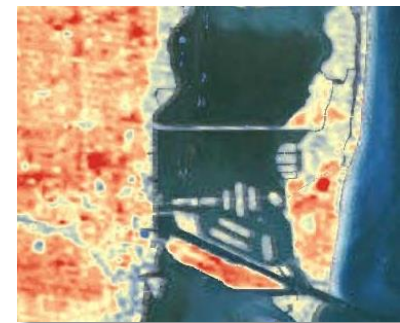
Project Scope

- Determine for the Urban Area of Miami-Dade County:
 - ❑ areas with current tree canopy (existing UTC)
 - ❑ with potential tree canopy (possible UTC)
 - ❑ unsuitable for tree canopy
- Determine the UTC percentage breakdown for
 - ❑ census places
 - ❑ commission districts
 - ❑ land use categories
 - ❑ property parcels



Project Scope

- Determine for the Urban Area of Miami-Dade County:
 - ❑ areas with current tree canopy (existing UTC)
 - ❑ with potential tree canopy (possible UTC)
 - ❑ unsuitable for tree canopy
- Provide the percentage breakdown for
 - ❑ census places
 - ❑ commissioner districts
 - ❑ property parcels
 - ❑ selected land use categories
- Relate percent of current UTC to
 - ❑ surface temperature
 - ❑ socio-economic data



Study Area

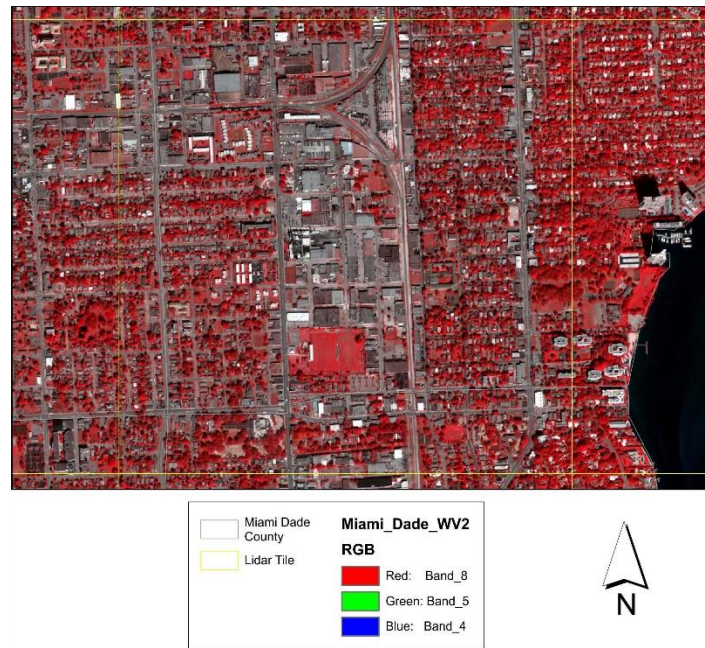
- Urban Area of Miami-Dade County
- 1150 km² (444 mi²)



Method

Create a land cover classification map, using:

- Satellite imagery
 - WorldView II: 8 band spectral resolution, 2m spatial resolution



Method

Create a land cover classification map, using:

- Satellite imagery
 - WorldView II: 8 band spectral resolution, 2m spatial resolution
- GIS vector layers from County and other sources, e.g.
 - Large and small buildings
 - Edge of pavement, railroads
 - Water bodies
 - Agricultural areas



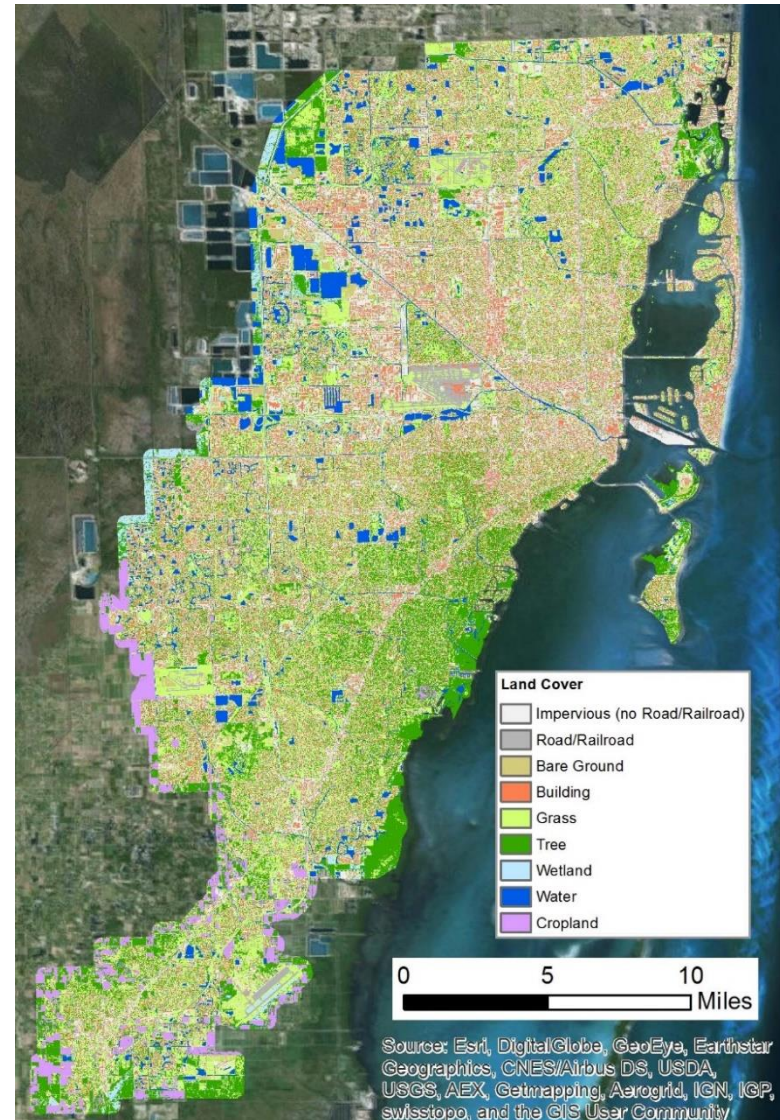
Method

Create a land cover classification map, using:

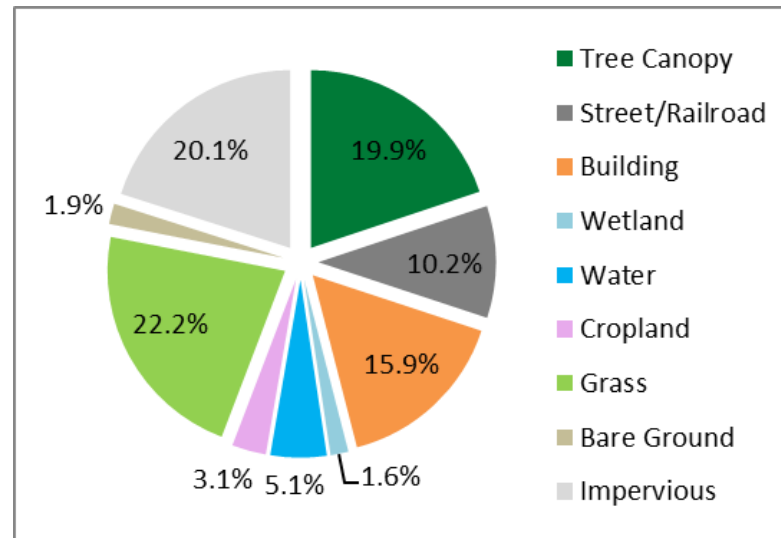
- Satellite imagery
 - WorldView II: 8 band spectral resolution, 2m spatial resolution
- GIS vector layers from County and other sources, e.g.
 - Large and small buildings
 - Edge of pavement, railroads
 - Water bodies
 - Agricultural areas
- Apply GIS spatial analysis functions for areal statistics

Results: Land Cover Classification Map

- 9 land cover categories



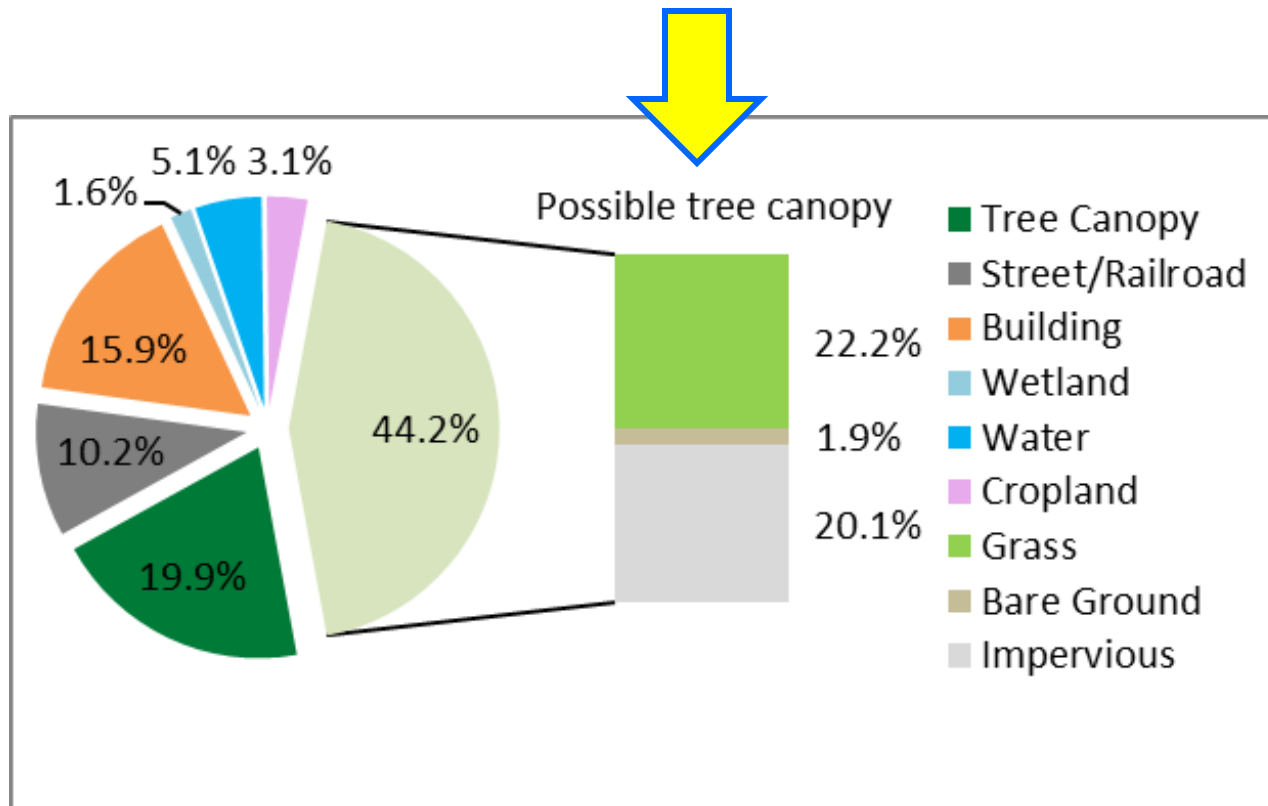
Land Cover Statistics



Class	Area (km ²)	Percent cover
Tree Canopy	228.6 (± 13.7)	19.9 (± 1.2)
Street/Railroad	117.2 (± 4.4)	10.2 (± 0.4)
Building	183.1 (± 11.7)	15.9 (± 1)
Wetland	18.7 (± 4.2)	1.6 (± 0.4)
Water	58.6 (± 4.6)	5.1 (± 0.4)
Cropland	35.6 (± 0.9)	3.1 (± 0.1)
Grass	255.8 (± 15.6)	22.2 (± 1.4)
Bare Ground	21.4 (± 0.9)	1.9 (± 0.1)
Impervious	230.9 (± 13.5)	20.1 (± 1.2)
Total	1150.0	100.00%

Land Cover Statistics

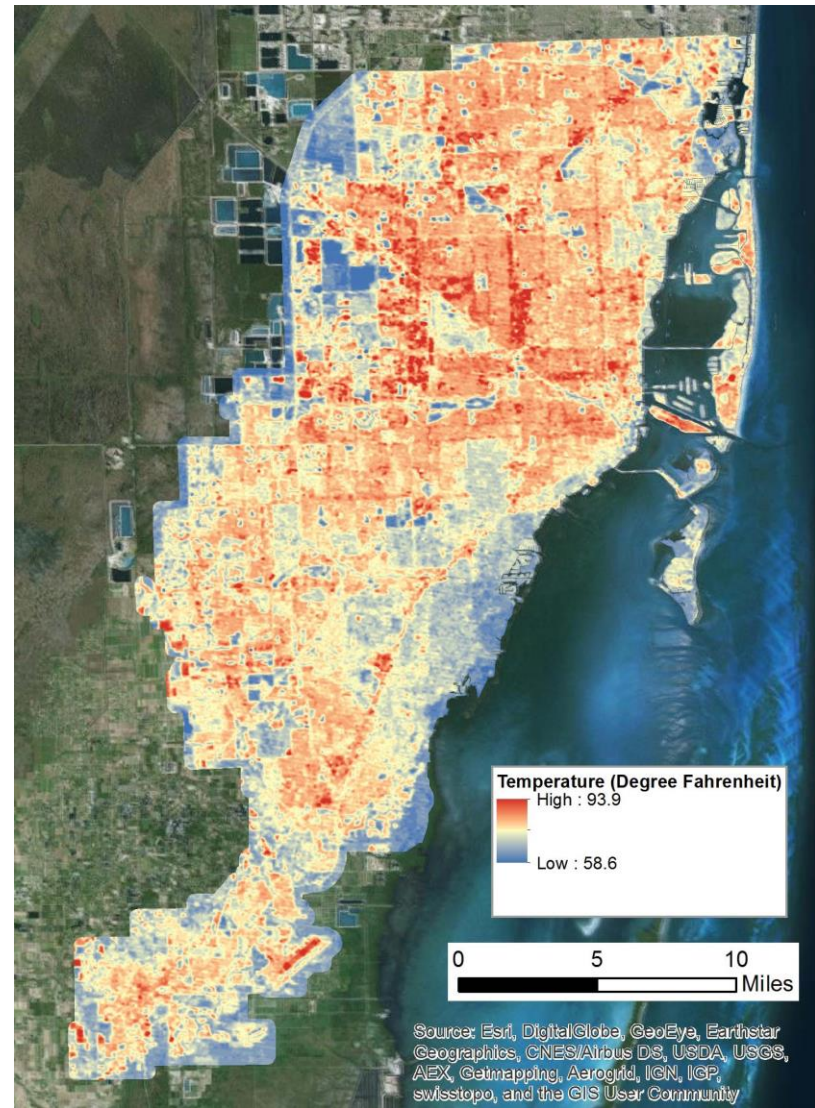
- Total possible tree canopy: 44.2%
- Possible tree canopy on pervious surfaces: 24.1%



Tree Canopy and Surface Temperature

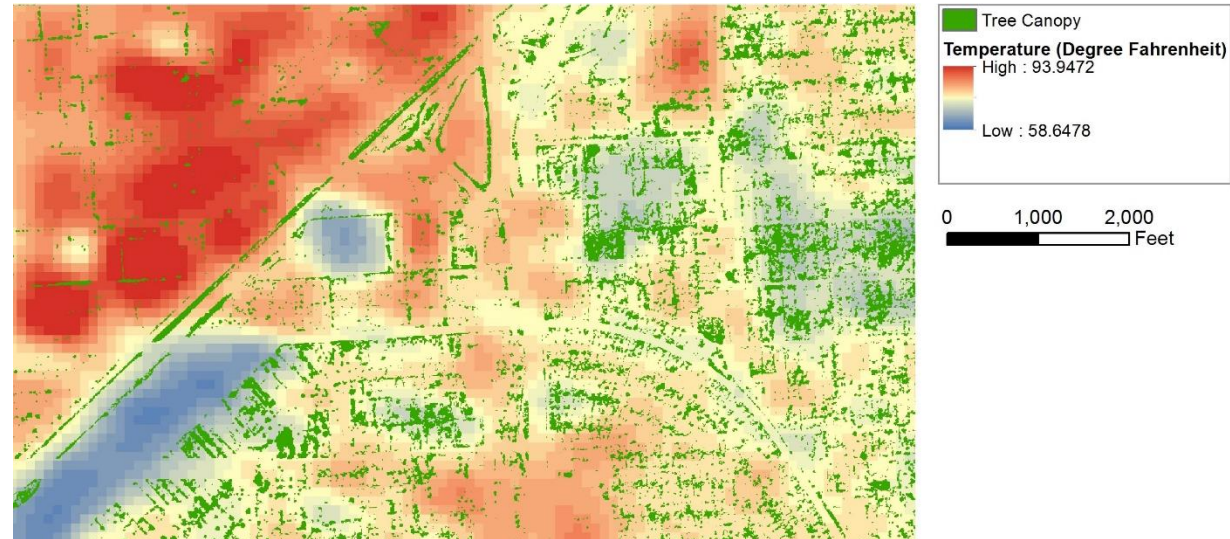
Temperature in
Degree Fahrenheit

Landsat Enhanced Thematic Mapper
(ETM) thermal band (30m)

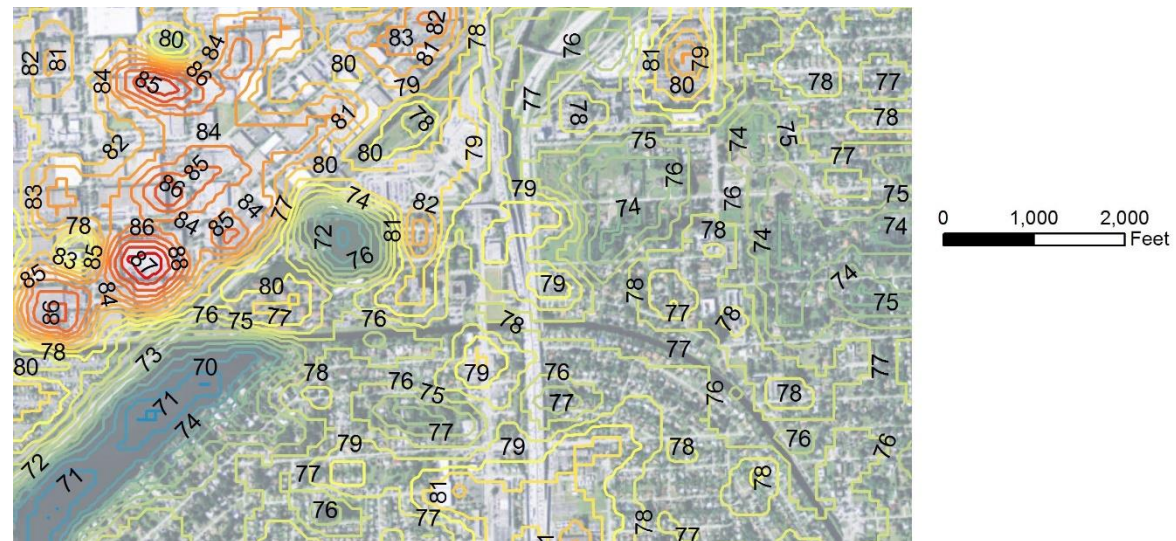


Tree Canopy and Surface Temperature

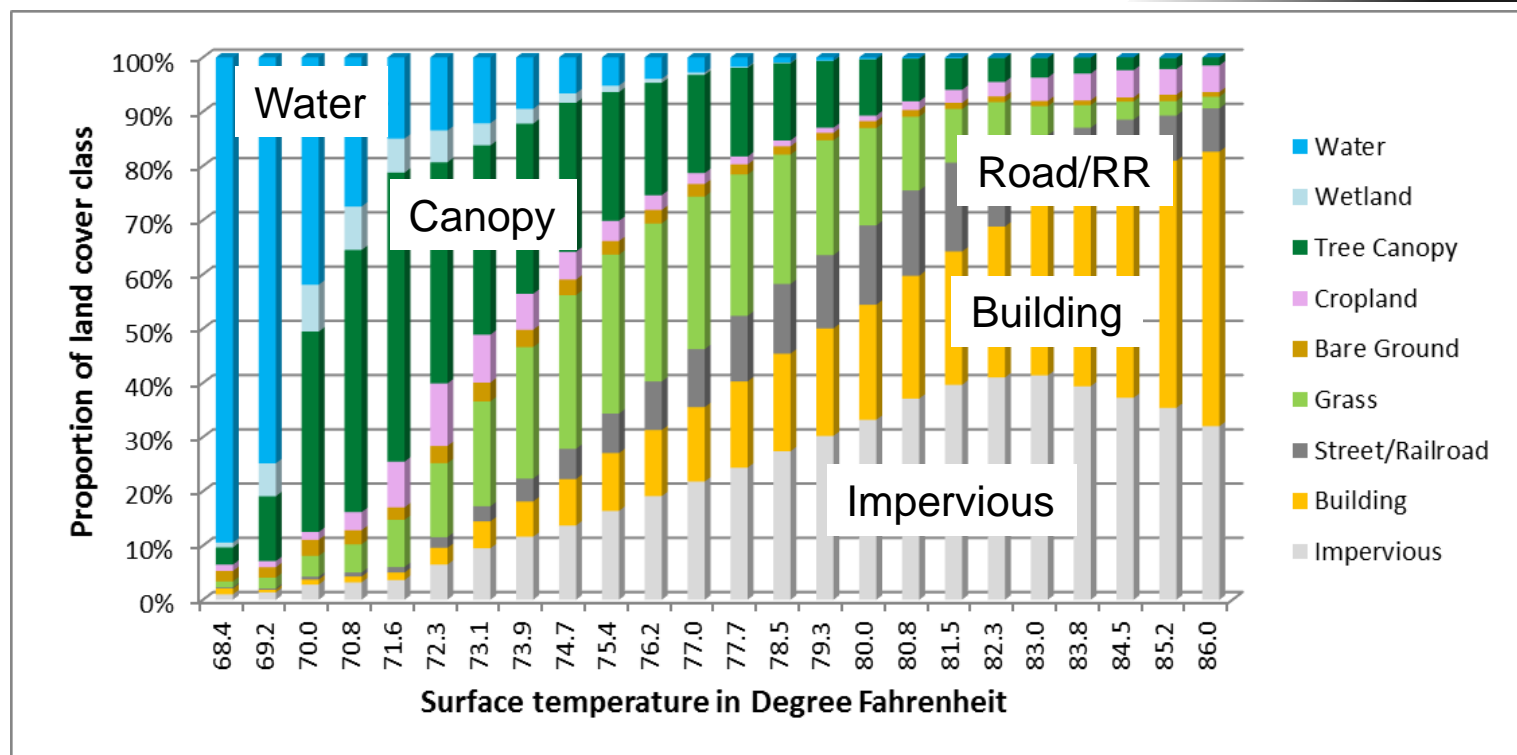
Heat map with
tree canopy



Contour map



Land Cover Mix and Temperature (°F)

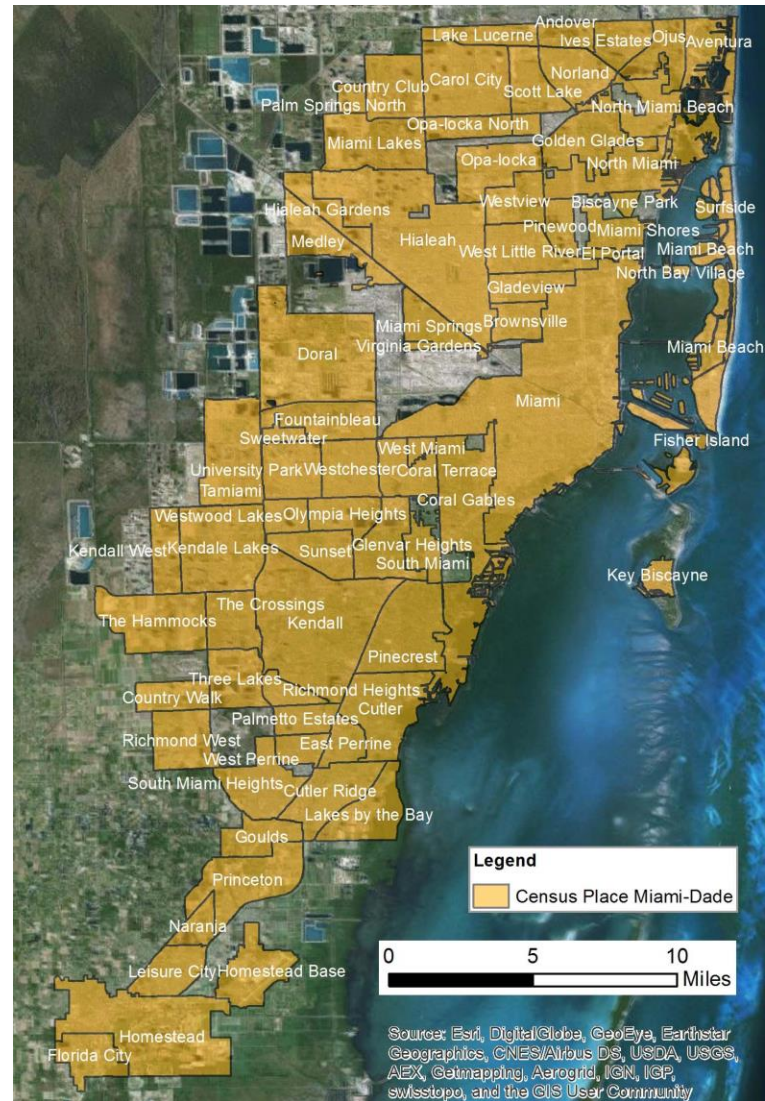


Bivariate correlations between percent land cover and surface temperature:

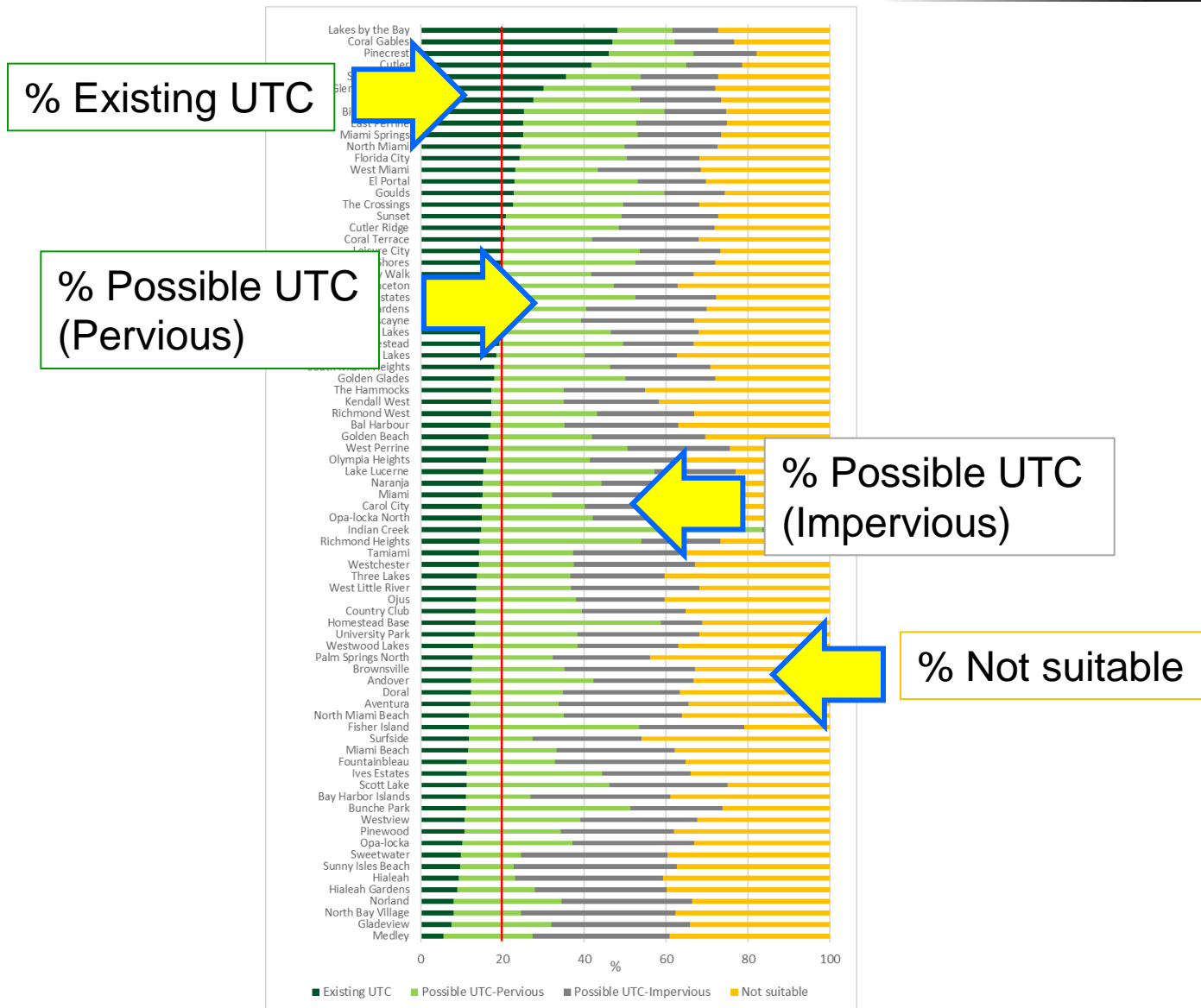
	% Impervious	% Street/RR	% Tree	% Water
r	0.410	0.346	-0.432	-0.171
p	<0.001	<0.001	<0.001	<0.001

Analysis of Census Places

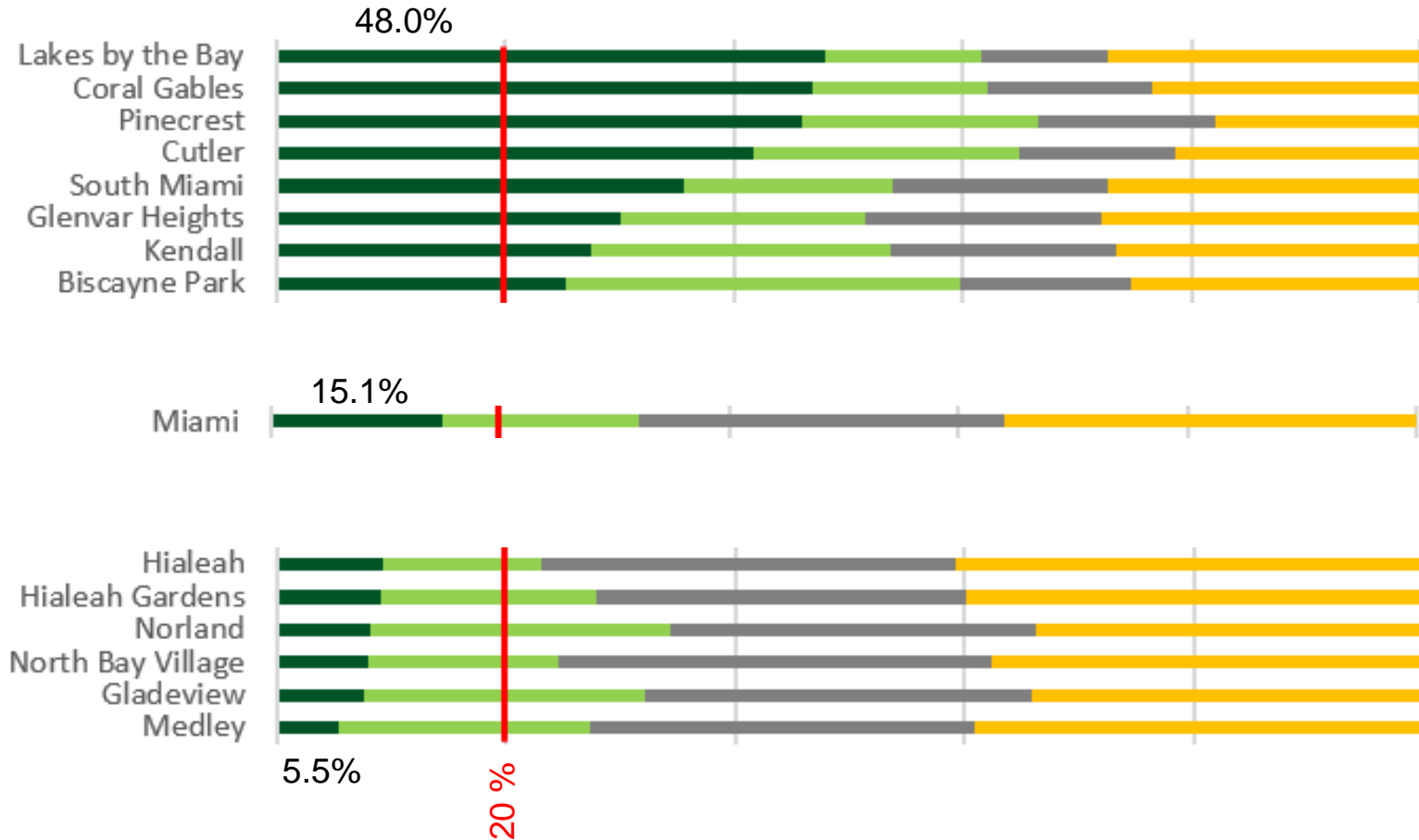
79 census places



Analysis of Census Places

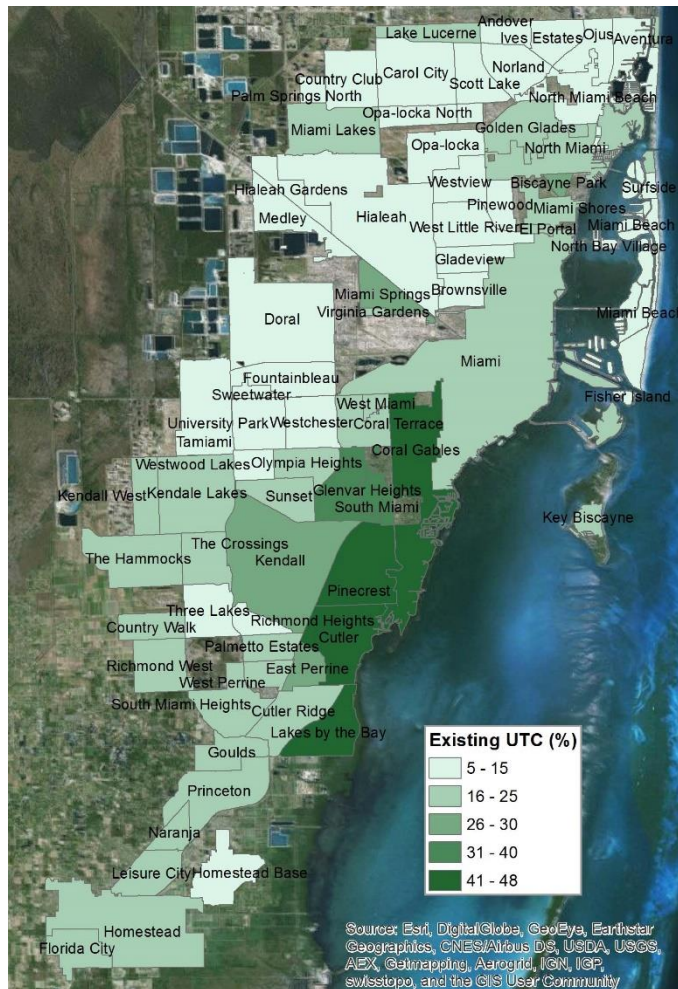


Analysis of Census Places: Subset

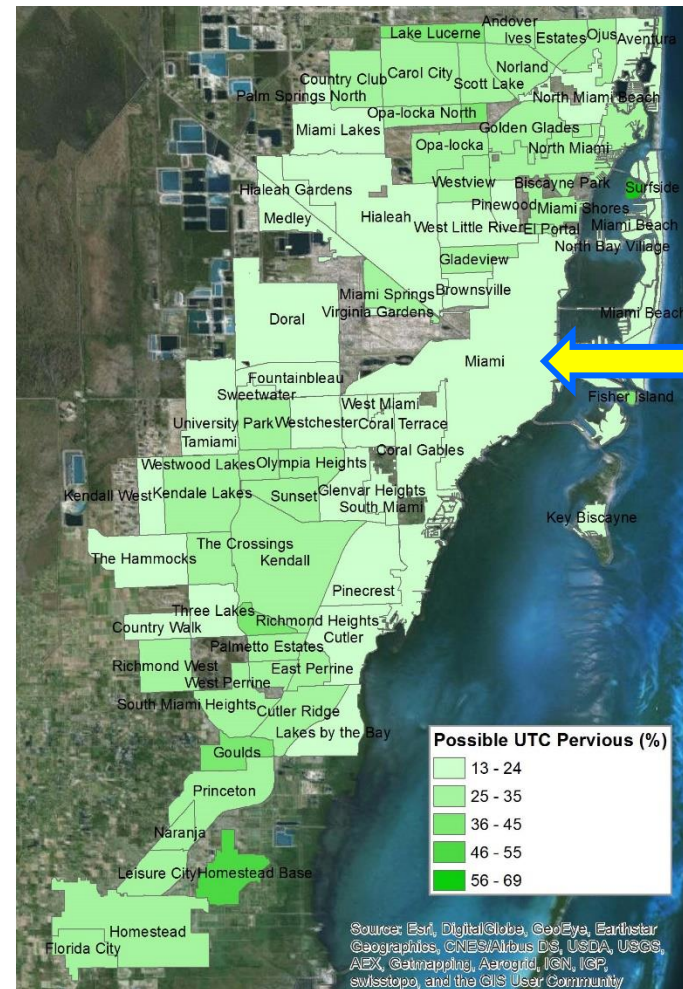


Analysis of Census Places: Maps

% Existing UTC



% Possible UTC (Pervious)



17.0%

Indian Creek

- 68.6 % Possible UTC (Pervious)



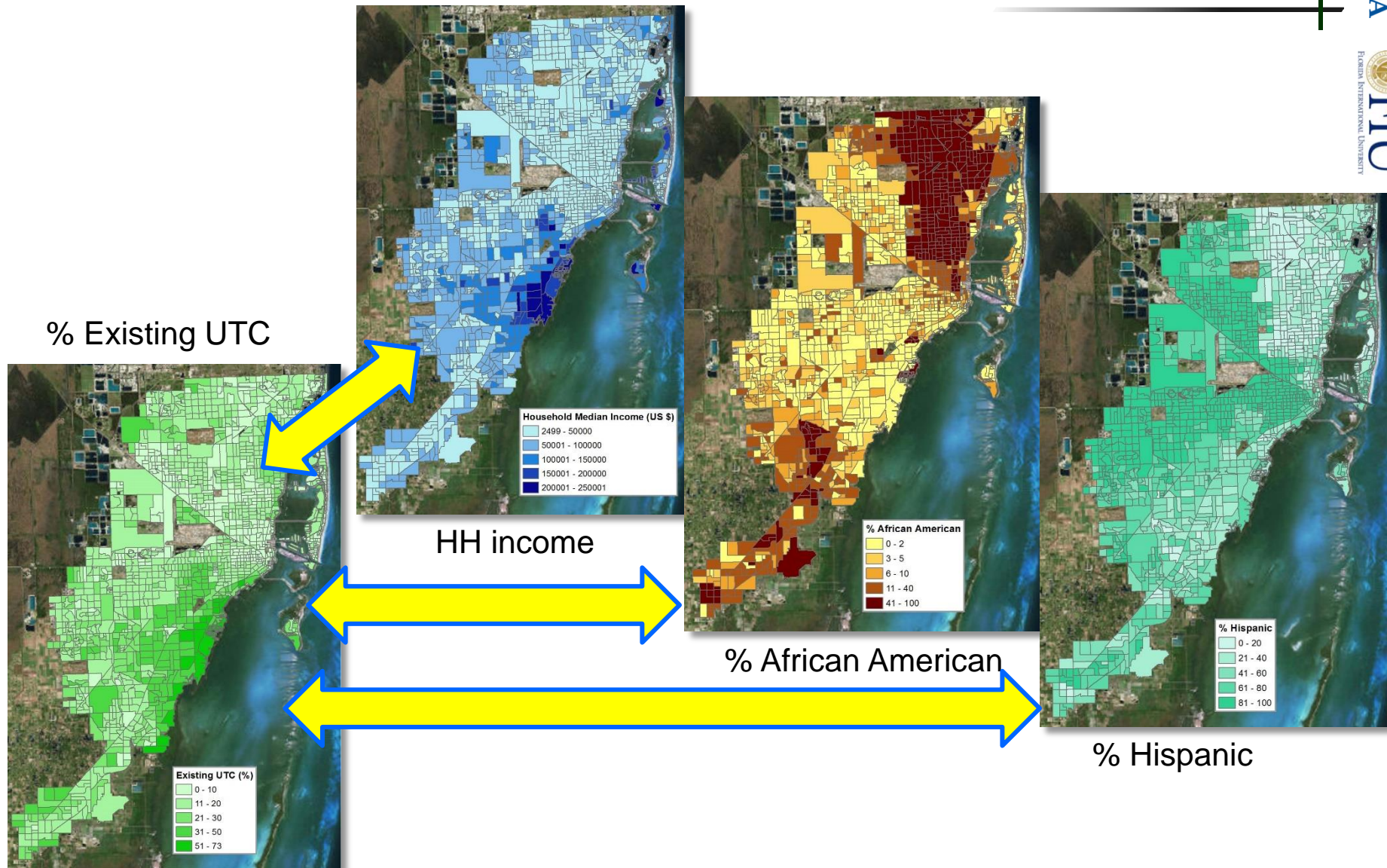
Existing and Possible Canopy in Parcels



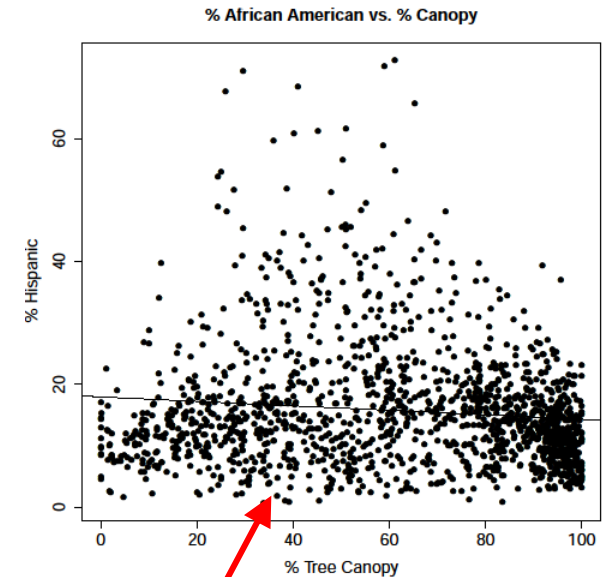
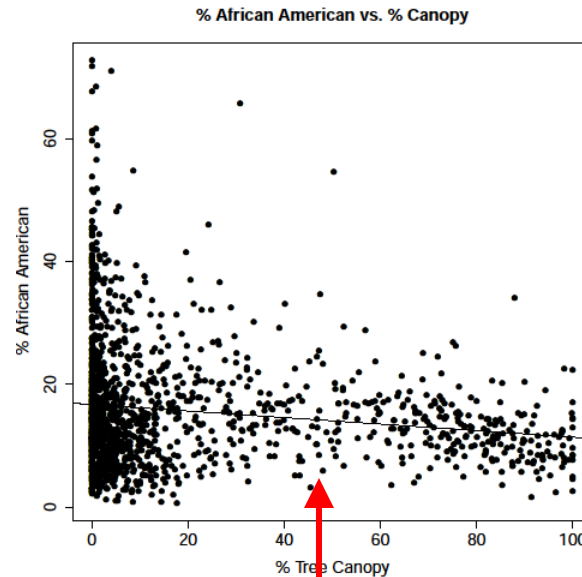
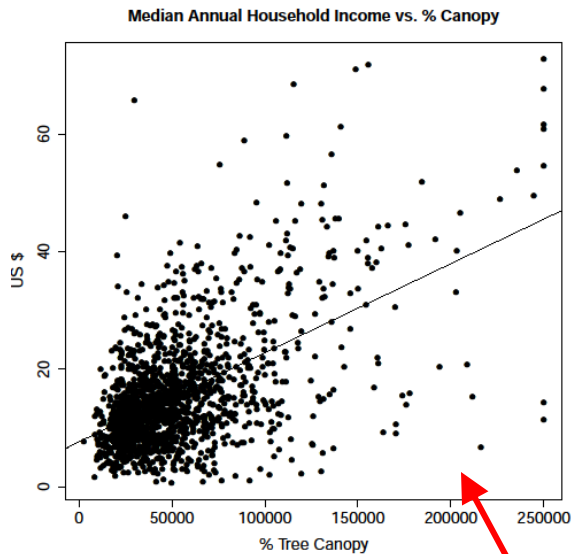
Analysis of Socioeconomic Variables

- Analysis for 1525 populated census block groups
- Relate % tree canopy to
 - ❑ median annual household income in US \$
 - ❑ percent African American population
 - ❑ percent Hispanic population

Analysis of Socioeconomic Variables: Maps



Bivariate Correlations with % Tree Canopy



	HH Income	% Afr. American	% Hispanic
r	0.547	-0.151	-0.107
p	<0.001	<0.001	<0.001

Summary

- Overall tree canopy was 19.9%
- Residential housing represents 42% of the existing tree canopy and 33% of possible tree canopy on pervious surfaces
- Tree canopy and water bodies are associated with lower surface temperatures
- Tree canopy is positively correlated with median income, but negatively correlated with percentage of African American and Hispanic residents